

**REVISION OF NORTH AMERICAN *ALEIODES* WESMAEL (PART 6):
THE *GASTERATOR* (JURINE) AND *UNIPUNCTATOR* (THUNBERG)
SPECIES-GROUPS (HYMENOPTERA: BRACONIDAE: ROGADINAE)**

PAUL M. MARSH AND SCOTT R. SHAW

(PMM) Cooperating Scientist, Systematic Entomology Laboratory, PSI, Agricultural Research Service, U.S. Department of Agriculture, % National Museum of Natural History, Washington, D.C. 20560-0168, U.S.A.; current address: P.O. Box 384, North Newton, KS 67117, U.S.A. (e-mail: swampy@southwind.net); (SRS) University of Wyoming Insect Museum, Department of Renewable Resources, University of Wyoming, Laramie, WY 82071-3354, U.S.A. (e-mail: braconid@uwo.edu)

Abstract.—The *Aleiodes gasterator* (Jurine) species-group is defined to include several Palaearctic species and the following species from North America: *atricornis* (Cresson), **n. comb.** (= *ferrugineus* Enderlein, **n. syn.**); *brachyphlebus*, **n. sp.**; *bucculentus*, **n. sp.**; *burrus* Cresson (= *fulvus* Cresson, **n. syn.**, *nigricoxis* Viereck, **n. syn.**, *cockerelli* Viereck, **n. syn.**, *fusicaudus*, **n. nud.**, *waldeni*, **n. syn.**); *carinatus* (Ashmead) **n. comb.** (= *pubescens* Ashmead, **n. syn.**, *nasonii* Ashmead, **n. nud.**); *medicinebowensis*, **n. sp.**; *smithi*, **n. sp.**; *townesorum*, **n. sp.**; *vierecki*, **n. sp.** The *unipunctator* (Thunberg) species-group also includes several Palaearctic species and the following North American species: *harrimani* (Ashmead), **n. comb.**; *pseudoterminalis*, **n. sp.**; *terminalis* Cresson. Both groups have small ocelli and have the marginal cell of the hind wing gradually widening to the wing apex. Species in the *gasterator* group are usually unicolored yellow or orange and have the malar space longer than the basal width of the mandible; species in the *unipunctator* group are bicolored black and red and have the malar space about equal to the basal width of the mandible.

Key Words: Braconidae, *Aleiodes*, parasitoids, revision

The rogadine braconid genus *Aleiodes* Wesmael is worldwide in distribution, but is particularly species-rich in the Holarctic Region. *Aleiodes* is well diversified in North America, with at least 90 species in the United States and Canada (S. Shaw et al. 1997). This study is the sixth in a series of planned papers on *Aleiodes* species-groups, intended to provide a complete revision of the genus for North America (see S. Shaw et al. 1997, 1998a, b; Marsh and S. Shaw 1998, 1999).

The species treated in this paper, the *gasterator* (Jurine) and *unipunctator* (Thun-

berg) species-groups, include some of the largest, commonest and most distinctive species in eastern North America. For example, *A. terminalis* Cresson is the most abundant species in collections, and one of the few that can be reliably identified, based on color patterns, even without magnification. All species are distinguished by small ocelli and the marginal cell of the hind wing gradually widening to the apex of the wing, narrowest at base. Species in the *gasterator* group are distinguished by the malar space being longer than the basal width of the mandible and by their generally brown

or orange unicolored body; the *unipunctator* group has a shorter malar space and the body is bicolored black and red. In their phylogenetic analysis of *Aleiodes*, Fortier and Shaw (1999) included three species-subgroups, *gasterator*, *atricornis* and *unipunctator*, within the *gasterator* species-group. We consider the *unipunctator* group as a distinct species-group as presented in the species-group key of S. Shaw et al. (1997). Because our main intent is to provide a revision of the North American species, species treatments are limited to the Nearctic fauna.

Aleiodes species are koinobiont endoparasitoids of lepidopterous larvae, especially macrolepidoptera of the superfamilies Noctuoidea and Geometroidea, and to a lesser extent, Arctioidea, Sphingoidea and Papilionoidea (S. Shaw et al. 1997). Very little is known about the biology of the species of the groups included in this paper, but the few records indicate parasitism of noctuid larvae. The method of parasitism, unique to the tribe Rogadini, is noteworthy: the *Aleiodes* larva completes its feeding and pupates within the shrunken and mummified remains of the host caterpillar. In all known cases, the form of the mummy caused by a particular *Aleiodes* species is characteristic for that host and parasitoid, so mummified remains are of considerable diagnostic value and should be retained with the parasitoid when reared. For a more complete discussion of *Aleiodes* biology, readers may refer to M. Shaw (1983, 1994), M. Shaw and Huddleston (1991), S. Shaw (1995) and S. Shaw et al. (1997).

METHODS

Species covered in this paper can be identified as members of the subfamily Rogadinae using the keys of S. Shaw (1995), M. Shaw and Huddleston (1991) or Wharton et al. (1997). Our definition of *Aleiodes* follows that of S. Shaw (1995), S. Shaw et al. (1997) and van Achterberg (1991). Specimens can be determined as *Aleiodes* using the keys of van Achterberg (1991) or

S. Shaw (1997). The species-groups of North American *Aleiodes* can be keyed using the key provided in S. Shaw et al. (1997). Fortier and Shaw (1999) provided a cladistic analysis of the *Aleiodes* species-groups.

Terminology follows that used for *Aleiodes* by S. Shaw et al. (1997), S. Shaw (1995) and Marsh (1989). Microsculpture terminology follows that of Harris (1979). Wing vein terminology agrees with the system adopted by Sharkey and Wharton (1997) and agrees closely with that of Huber and Sharkey (1993). A labeled diagram of wing veins was provided by S. Shaw et al. (1997).

Acronyms for collections where type material is deposited are as follows: ABS (Archbold Biological Station, Lake Placid, FL), AEI (American Entomological Institute, Gainesville, FL), ANSP (Academy of Natural Sciences, Philadelphia, PA), BMNH (The Natural History Museum, London, UK), CNC (Canadian National Collection, Ottawa, Ontario, Canada), CSU (Colorado State University, Fort Collins, CO), INHS (Illinois Natural History Survey, Champaign, IL), MCZ (Museum of Comparative Zoology, Harvard University, Cambridge, MA), MISS (Mississippi State University, Mississippi State, MS), MSU (Michigan State University, East Lansing, MI), NCDA (North Carolina Department of Agriculture, Raleigh, NC); NCSU (North Carolina State University, Raleigh, NC), NNML (Nationaal Natuurhistorisch Museum, Leiden, The Netherlands), RMSEL (Rocky Mountain Systematic Entomology Laboratory, University of Wyoming, Laramie, WY), TAMU (Texas A&M University, College Station, TX), UCD (University of California, Davis, CA), UK (University of Kansas, Lawrence, KS), USNM (National Museum of Natural History, Smithsonian Institution, Washington, DC).

ALEIODES GASTERATOR SPECIES-GROUP

Included species.—*gasterator* (Jurine) 1807, **n. comb.**, Europe; *grassator* (Thun-

berg) 1822, **n. comb.**, Europe; *burrus* Cresson 1869, North America; *atricornis* (Cresson) 1872, **n. comb.**, North America; *carinatus* (Ashmead) 1889, **n. comb.**, North America; *rufipes* (Thomson) 1891, **n. comb.**, Europe; *ecuadoriensis* (Brues) 1926, **n. comb.**, Ecuador; *pallidistigmus* (Telenga) 1941, **n. comb.**, Europe; *conformis* (Muesebeck) 1960, **n. comb.**, Uruguay; *fortis* (Muesebeck) 1960, **n. comb.**, Uruguay; *brachyphlebus*, n. sp.; *bucculentus*, n. sp.; *medicinebowensis*, n. sp.; *smithi*, n. sp.; *muesebecki*, n. sp.; *townesorum*, n. sp.

Diagnostic characters.—Oral opening oval, diameter equal to or slightly greater than malar space; malar space at least equal to basal width of mandible, usually longer (Fig. 8); hind wing marginal cell narrowest at base, widening to wing apex, vein RS not sinuate.

Comments.—This is a large group distinguished by the small ocelli, hind wing marginal cell narrowest at base and the non-pectinate tarsal claws. It is distinguished from the *unipunctator* species-group by the wider malar space and the generally unicolored body (see key to species-groups in S. Shaw et al. 1997).

- Antenna entirely black, brown or yellow, or yellow at base gradually darkening to apex, without white annulus 5
- 5(4). First metasomal tergum coarsely rugose, without any indication of costae (Fig. 9) *burrus* Cresson
- First metasomal tergum costate or costate rugose (Fig. 10) 6
- 6(5). Antenna with less than 40 antennomeres; metasomal terga 1–2 orange, terga 3–7 black 7
- Antenna with more than 40 antennomeres; body entirely honey yellow or orange . . . 8
- 7(6). Hind femur black on apical 2/3; malar space usually orange . . . *townesorum*, new species
- Hind femur orange; malar space black *bucculentus*, new species
- 8(6). Diameter of lateral ocellus equal to or slightly greater than ocell-ocular distance; hind wing vein RS parallel to anterior wing margin on basal 1/2 and distinctly curving downward toward wing apex (Fig. 3); temples in dorsal view narrow, less than eye width *vierecki*, new species
- Diameter of lateral ocellus less than ocell-ocular distance; hind wing vein RS more or less straight to wing apex; temples in dorsal view as wide as eye . . . *atricornis* (Cresson)

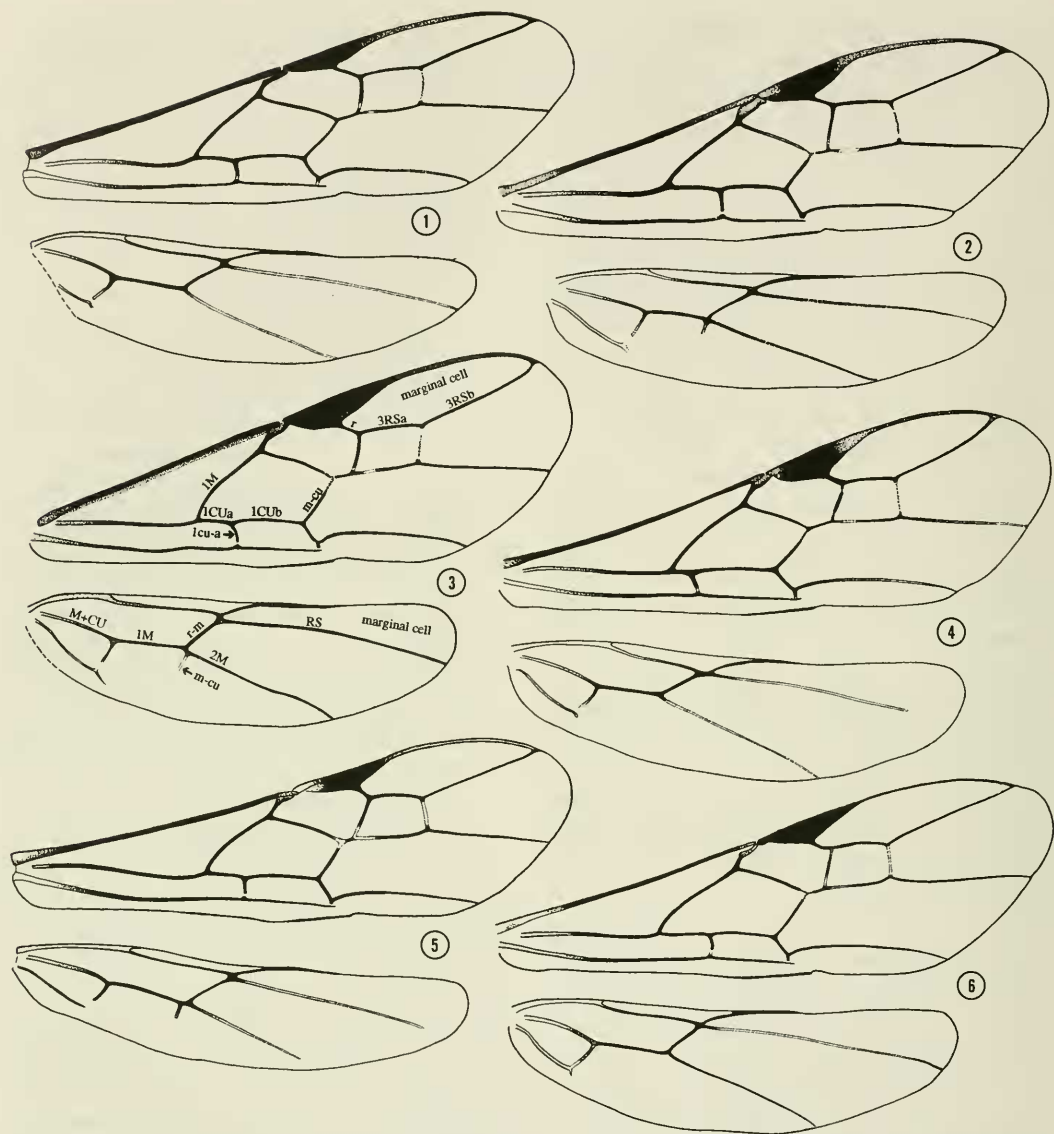
Aleiodes atricornis (Cresson),
new combination
(Figs. 2, 10)

Rogas atricornis Cresson 1872:188.
Rhogas ferrugineus Enderlein 1920 (1918): 156. **N. syn.**

Diagnosis.—Body unicolored honey yellow to yellow orange, mesosoma occasionally marked with black in male, apical tarsomere brown, antenna with scape and pedicel honey yellow and flagellum either entirely brown or orange on basal half darkening to brown on apical half, wings hyaline, veins yellow to brown; body length, 6.0–9.5 mm; 58–68 flagellomeres; length of malar space greater than basal width of mandible; diameter of oral opening greater than basal width of mandible and equal to malar space; face costate-coriaceous, frons, vertex and temple coriaceous; pronotum coriaceous, rugose laterally, mesonotum and scutellum coriaceous, mesopleuron coriaceous, subalar sulcus and sternaulus weakly rugulose, propodeum ru-

KEY TO THE NORTH AMERICAN SPECIES OF THE *GASTERATOR* SPECIES-GROUP

- 1. Fore wing vein 1cu-a beyond 1M by distance less than or equal to length of 1cu-a, rarely slightly longer (Fig. 4) 2
- Fore wing vein 1cu-a beyond 1M by distance distinctly greater than length of 1cu-a (Fig. 1). 4
- 2(1). Body bicolored, head and mesosoma black, metasoma red *carinatus* (Ashmead)
- Body unicolored orange or yellow, at most apical metasomal terga black 3
- 3(2). Fore wing vein 3RSb curved and reaching wing margin well before apex of wing, marginal cell short (Fig. 4); antenna with more than 40 antennomeres *brachyphlebus*, new species
- Fore wing vein 3RSb straight and reaching wing margin near wing apex, marginal cell longer; antenna with 40 antennomeres or less *medicinebowensis*, new species
- 4(1). Antenna black with middle third of flagellum white *smithi*, new species



Figs. 1–6. Wings of *Aleiodes* species. 1, *A. burrus*. 2, *A. atricornis*. 3, *A. vierecki*. 4, *A. brachyphlebus*. 5, *A. smithi*. 6, *A. terminalis*.

gose coriaceous, median carina usually complete, occasionally absent apically; first and second metasomal terga costate coriaceous, median carina complete, third tergum costate on basal half, median carina absent (Fig. 10); fore wing with vein 1cu-a beyond 1M by distance nearly twice length of 1cu-a; hind wing with marginal cell gradually widening, vein RS straight, vein m-cu short and weak (Fig. 2); tarsal claws

not pectinate but with 2–3 thin spines at extreme base.

Type material examined.—*Rogas atricornis* Cresson, lectotype female (designated by Cresson 1916), Texas [Philadelphia]. *Rogas ferrugineus* Enderlein, lectotype female (here designated to fix the current interpretation of this name and to ensure stability and uniformity in its future interpretation), Mexico, Chiapas, L. Conradt S.

[Warsaw]; paralectotype male (here designated), same data.

The status of the type series of *atricornis* is very confused because of the existence of labeled type specimens at both Philadelphia (7 specimens) and Washington D.C. (4 specimens) that exceed the total number of specimens in the original syntype series (4 specimens). Cresson (1872) described *atricornis* based on four female specimens from Texas (Belfrage collection). In the introduction of that paper he stated that "unless otherwise indicated" the types "are to be found in the collection of the American Entomological Society" (Philadelphia). Since he did indicate "Belfrage" as the source of these specimens, presumably part of the syntype series may have been returned to Mr. Belfrage after the completion of the 1872 work. However, it is not clear, either from statements in the 1872 paper or from examination of the specimens in Philadelphia and Washington, DC, which four specimens actually comprise the original syntype series. Mr. Belfrage died in 1882, and subsequently his collection was donated to the Smithsonian Institution. Among the specimens accessioned at the Smithsonian were exactly four female specimens now with "Texas, Belfrage" labels. By 1896 these four specimens had been assigned the USNM type number 1622, indicating that they were presumed to be the type series at that point in time. In 1916 Cresson published his paper on the Cresson types of Hymenoptera, wherein a lectotype of *atricornis* was designated from the material at Philadelphia and assigned type number 1672 (although E. T. Cresson, Jr. assisted with the preparation of this manuscript, it was published by E. T. Cresson, Sr.). This data indicates a single specimen from Texas in good condition, but Belfrage is not listed on the label data, nor are other specimens listed. Cresson (1916) stated that "unique" specimens were returned to Mr. Belfrage. Since *atricornis* was described based on four specimens (not unique), we must assume that at least one syntype was

kept in Philadelphia. Clearly, more specimens were later collected by Mr. Belfrage and donated to both the American Entomological Society and the Smithsonian Institution. These specimens have now become mixed with the syntype series such that it is now impossible for us to determine with certainty the identity of the four syntypes. Given that Cresson (1916) recognized the Belfrage collection as being in Washington, DC, and designated other lectotypes based on the USNM material, we must assume that he correctly picked an original syntype in Philadelphia as the lectotype in this case. However, since the identity of the remaining three syntype specimens is uncertain, it would be fruitless to attempt to identify the paralectotypes at this time.

Distribution.—Specimens examined were from South Dakota, Nebraska, Kansas, Oklahoma, Texas, New Mexico, Arizona and Mexico.

Biology.—Several noctuid hosts are listed in the literature but we have seen no specimens reared from hosts; these records need to be confirmed.

Comments.—*Aleiodes atricornis* was previously distinguished from *ferrugineus* only by the color of the antenna, that of *atricornis* being entirely brown and that of *ferrugineus* being orange basally changing to brown apically. Otherwise they are identical in morphology and distribution and we consider them to be the same species. Delfin and Wharton (2000) transferred *ferrugineus* to *Aleiodes*.

***Aleiodes brachyphlebus* Marsh and
Shaw, new species
(Fig. 4)**

Female.—*Body color:* dark honey yellow or brown with black marking along notauli, sternaulus, sides of scutellum, metanotum, propodeum and first metasomal tergum; antenna brown basally, becoming black toward apex; wings hyaline, veins brown. *Body length:* 5–7 mm. *Head:* eyes and ocelli normal size; 46 antennomeres,

first flagellomere longer than second, basal half of flagellomeres about as wide as long; malar space $\frac{1}{2}$ eye height and equal in length to basal width of mandible; temple about $\frac{3}{4}$ eye width; occipital carina not meeting hypostomal carina; oral space broad and oval, width greater than malar space and face length; clypeus protruding; ocelli small, ocellocular distance slightly greater than diameter of lateral ocellus; face, frons and vertex rugose, temple smooth; maxillary palpus not swollen; mandibles large, tips crossing when closed. *Mesosoma*: pronotum rugose laterally; mesonotum weakly coriaceous and dull anteriorly, shining and smooth posteriorly, scutellum smooth and shining; notauli weakly scrobiculate, meeting posteriorly in small triangular rugose area; mesopleuron weakly punctate and shining, subalar sulcus and sternaulus rugose; propodeum rugose, median carina present only weakly at base. *Legs*: tarsal claws long and slender, not pectinate at apex, with 4–5 short slender spines at extreme base; inner spur of hind tibia about as long as $\frac{1}{2}$ hind basitarsus; hind coxa weakly punctate and shining dorsally. *Wings* (Fig. 4): fore wing vein r $\frac{1}{2}$ length of 3RSa and of m-cu, marginal cell short, vein 3RSb meeting wing margin well before wing apex, vein 1cu-a beyond 1M by distance slightly less than length of 1cu-a, vein 1CUa $\frac{1}{4}$ length of 1CUB; hind wing with vein RS straight on basal half, bent downward on apical half so marginal cell suddenly wider at apex, vein r-m slightly shorter than 1M, vein M+CU longer than 1M, vein m-cu indicated only by short clear raised line. *Metasoma*: first tergum costate-coriaceous, length about equal to apical width, median carina complete; second tergum costate-coriaceous, median carina complete; third tergum costate on basal half, smooth on apical half, median carina absent; remainder of terga smooth; ovipositor about $\frac{3}{4}$ length of hind basitarsus.

Male.—Essentially as in female.

Holotype.—♀: WASHINGTON, Ritz-

ville, May 10, 1922, M. C. Lane col. Deposited in USNM.

Paratypes.—BRITISH COLUMBIA: 1 ♀, Stone Mt. Pk., 3,800 ft., July 13, 1973, H. and M. Townes. COLORADO: 2 ♀, Mesa Co., Big Wash, May 4, 1992, Kondratieff, Cranshaw & H. Knuttel. NEBRASKA: 2 ♀, Valentine Refuge, June 4, 1972, H. and M. Townes. OREGON: 3 ♀, 4 ♂, Riley, April 29 and May 18, 1976, H. and M. Townes. WASHINGTON: 1 ♀, same data as holotype. WYOMING: 1 ♂, Albany Co., T15N R73W, 7,500', May 15, 1978, C. D. Ferris. Deposited in USNM, RMSEL, CSU, AEI.

Biology.—Unknown.

Comments.—This species is superficially similar to *burrus* and *atricornis* but is distinguished by the short fore wing marginal cell, the short distance separating vein 1cu-a from 1M, and the smooth mesonotum.

Etymology.—The specific name is from the Greek *brachys* meaning short and the Greek *phlebos* meaning vein, referring to the short radial vein and radial cell in the fore wing.

Aleiodes bucculentus Marsh and Shaw, new species

Female.—*Body color*: head orange except temple and malar space which are black, antenna orange, apical $\frac{1}{3}$ of flagellum brown; mesosoma orange, mesopleuron, metanotum and sides of propodeum black; first and second metasomal terga orange, third tergum varying from entirely black to black on apical $\frac{1}{3}$ and orange on basal $\frac{2}{3}$, remainder of terga black, metasomal venter orange; legs orange, apex of hind femur and tibia marked with brown, apical tarsomere of hind leg sometimes black; wings dusky, veins brown. *Body length*: 5.5–6.0 mm. *Head*: eye small, malar space $\frac{3}{5}$ eye height and longer than basal width of mandible; temple as wide as eye, swollen in dorsal view; 36–38 antennomeres, nearly all flagellomeres as wide as long; occipital carina not distinctly meeting hypostomal carina; oral space circular, slightly wider than basal

width of mandible; ocelli small, ocellular distance about twice diameter of lateral ocellus; face rugulose-coriaceous, frons rugose, vertex and temple coriaceous; maxillary palpus short and slightly swollen. *Mesosoma*: pronotum rugose laterally; mesonotum and scutellum coriaceous, notauli weakly scrobiculate, area where they meet obscured by pin; mesopleuron smooth medially except for hair pits, subalar sulcus and sternaulus rugose; propodeum rugose, median carina complete. *Legs*: tarsal claws not pectinate; hind coxa somewhat rugulose dorsally. *Wings*: fore wing with vein r $\frac{1}{4}$ length of 3RSa and $\frac{1}{2}$ length of m-cu, vein 1cu-a beyond 1M by distance greater than length of 1cu-a, vein 1CUa $\frac{1}{2}$ length of 1CUB; hind wing marginal cell gradually broadening to apex, vein RS straight, vein M+CU twice length of 1M, vein r-m about $\frac{3}{5}$ length of 1M. *Metasoma*: first tergum wider at apex than long, costate-rugose, median carina complete; second tergum costate, median carina complete, third tergum costate on basal $\frac{1}{2}$, smooth on apical $\frac{1}{2}$; remainder of terga smooth; ovipositor short, less than $\frac{1}{2}$ length of hind basitarsus.

Male.—Unknown.

Holotype.—♀: ALBERTA, Kananaskis, For. Exp. Sta. Seebe, June 15, 1968, H. J. Teskey, Malaise trap. Deposited in CNC.

Paratypes.—ALBERTA: 2 ♀, Bilby, June 7, 27, 1924, George Salt. MANITOBA: 1 ♀, Churchill, June 29, 1956. Deposited in USNM, RMSEL, BMNH.

Biology.—Unknown.

Comments.—The swollen temples are characteristic for this species which, along with the color of the head and hind legs, will distinguish it from *townesorum*.

Etymology.—The specific name is from the Latin *bucculentus* meaning full cheeks in reference to the swollen temples.

Aleiodes burrus Cresson
(Figs. 1, 8, 9)

Aleiodes burrus Cresson 1869:381.

Aleiodes fulvus Cresson 1869:381. **N. syn.**

Rhogas nigrivicoxis Viereck 1903:97. **N. syn.**

Rhogas cockerelli Viereck 1905:266. **N. syn.**

Rhogas fuscicaudus Viereck, in Withington 1909:329. **N. nud.**

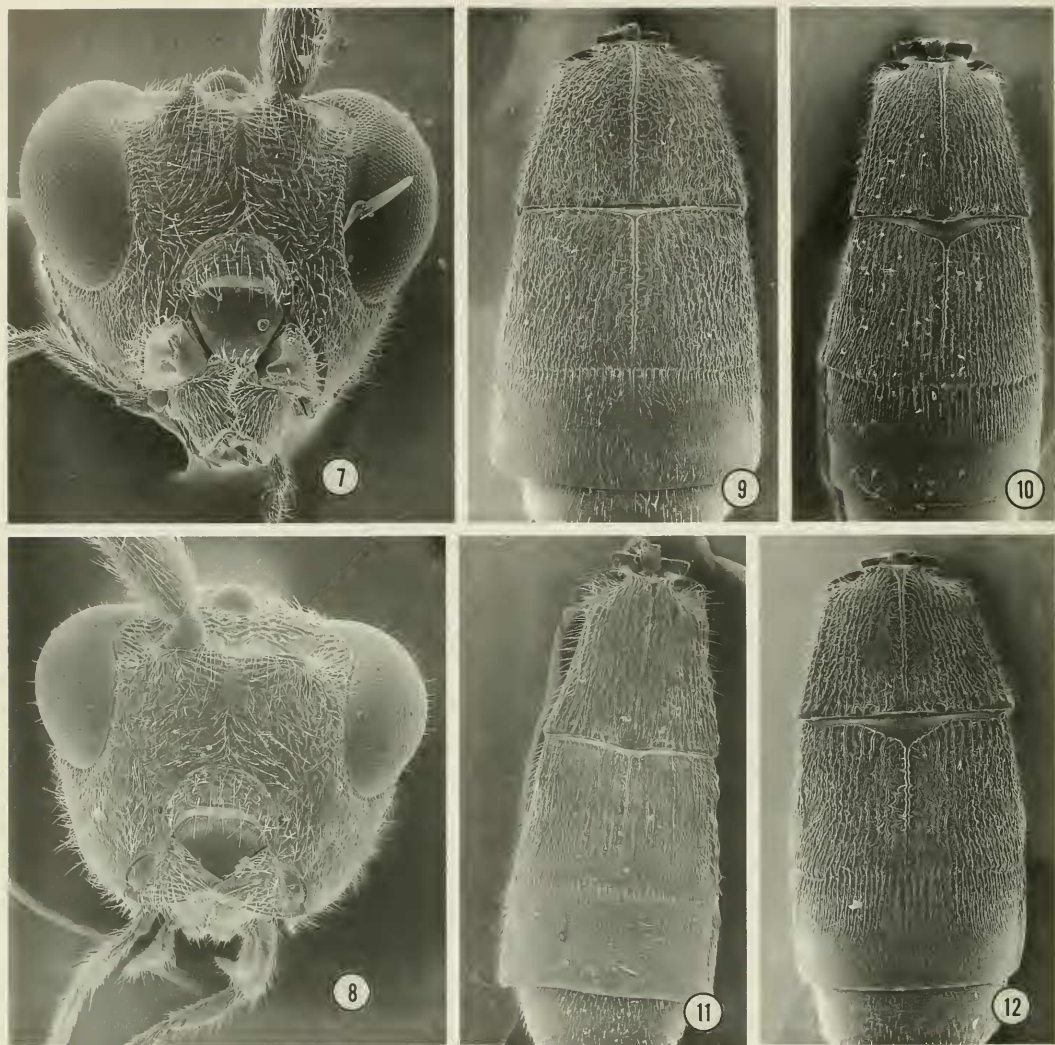
Aleiodes waldeni Viereck 1917(1916):236. **N. syn.**

Rogas burrus: Marsh 1979:179.

Aleiodes burrus: Delfin and Wharton 2000: 58.

Diagnosis.—Body unicolored in female and some males, honey yellow, occasionally with black markings on mesosoma, antenna orange basally to black at apex; in many males, body often bicolored orange and black, head and mesosoma black, metasoma orange or orange and black, wings hyaline, veins brown, vein C+Sc+R in fore wing of female often yellow; body length, 6.0–8.0 mm; 45–52 antennomeres in female, 55–60 in male; malar space longer than basal width of mandible (Fig. 8); face, frons and vertex rugose to rugose-areolate, temple sometimes nearly smooth; ocellular distance greater than diameter of lateral ocellus; pronotum rugose; mesonotum coriaceous-punctate, punctures deep and conspicuous in male, mesopleuron rugose except punctate shining medially; propodeum rugose, median carina complete; first and second metasomal terga coarsely rugose, first tergum always and second usually without any or only weak indications of costae, median carina complete, third tergum costate on basal $\frac{1}{3}$ – $\frac{1}{2}$ median carina absent (Fig. 9); vein 1cu-a of fore wing beyond 1M by distance greater than length of 1cu-a; hind wing marginal cell gradually widening, vein RS straight or bent slightly downward at middle, vein m-cu present but weak (Fig. 1); tarsal claws not pectinate.

Type material examined.—*Aleiodes burrus* Cresson, lectotype female, Illinois [ANSP]. *Aleiodes fulvus* Cresson, lectotype male, Canada [ANSP]. *Rhogas nigrivicoxis* Viereck, holotype male, Beulah, New Mexico [ANSP]. *Rhogas cockerelli* Viereck, holotype male, Douglas County, Kansas [UK].



Figs. 7–12. 7–8, Head of *Aleiodes* species. 7, *A. terminalis*. 8, *A. burrus*. 9–12, Metasomal terga of *Aleiodes* species. 9, *A. burrus*. 10, *A. atricornis*. 11, *A. harrimani*. 12, *A. pseudoterminalis*.

Aleiodes waldeni Viereck, holotype male, Stonington, Connecticut [USNM].

Distribution.—Eastern Canada south to Virginia, west to Alberta and Arizona.

Biology.—Reared from the noctuids *Acronicta hasta* Guenée, *A. lobeliae* Guenée, and *Feltia subgathica* (Haworth).

Comments.—This large honey-yellow and moderately common species is distinctive by its coarsely rugose first metasomal tergum and the usually bicolored black and orange male. Previously, the exact identities of the species *fulvus*, *nigricoxis*, *cockerelli*

and *waldeni*, all described from males, were problematic. After closer examination, it is clear that they all represent the males of this dimorphically colored species. For many years the identities of *cockerelli* Viereck and *fuscicaudus* Viereck were not certain because no holotypes were found. Recently a specimen was found in the Snow Entomological Museum, University of Kansas, labeled as the type of *fuscicaudus* but which agrees precisely with the original description and locality data of *cockerelli*. The name *fuscicaudus* appears only in a list of

types in the Snow Museum published by Withington (1909). We suspect that Viereck described the species as *fuscicaudus* in his original manuscript, changed the name to *cockerelli* in the published version, but failed to change the type label on the specimen from which Withington made his entry.

Aleiodes carinatus (Ashmead),
new combination

Rhysipolis carinatus Ashmead 1889 (1888): 625.

Rhogas pubescens Ashmead 1889 (1888): 632. N. syn.

Aleiodes nasonii Ashmead: Nason 1905: 298. N. nud.

Diagnosis.—Body bicolored, head, mesosoma and coxae black, tegula yellow, palpi, mandibles, remainder of legs and metasoma mostly orange, wings dusky hyaline, stigma black; body length 9 mm; 66–68 antennomeres; malar space short, equal to or less than basal width of mandible; face and frons rugose, temple and vertex rugose-coriaceous; mesonotum and scutellum coriaceous; pronotum rugose; mesopleuron rugose, smooth above episternal scrobe; propodeum coarsely rugose dorsally, rugose-coriaceous laterally, median carina complete; first and second metasomal terga rugose, median carinae complete; third tergum striate on basal half, coriaceous on apical half, median carina on basal half only; remainder of terga coriaceous; vein 1cu-a of fore wing beyond 1M by distance less than length of 1cu-a, hind wing marginal cell narrowest basally, gradually widening apically, vein RS straight; tarsal claws with 2–3 short spines at base, hind coxa rugulose dorsally.

Type material examined.—*Rhysipolis carinatus* Ashmead, holotype male, Texas [USNM]; *Rhogas pubescens* Ashmead, holotype male, Wisconsin [USNM].

Distribution.—Wisconsin, Illinois, and Texas.

Biology.—Host unknown.

Comments.—At present known only from the male. This species is likely the male of another species but we have not found any females with the combination of characters that distinguish *carinatus*, namely the bicolored body with entirely orange metasoma, the short malar space, and vein 1cu-a of the fore wing positioned close to the vein 1M.

Aleiodes medicinebowensis Marsh and
Shaw, new species

Female.—*Body color*: dark honey yellow; antenna honey yellow on basal half, brown on apical half; maxillary palpomeres 1 and 2 and labial palpi entirely black; mesosternum black; wings dusky, veins dark brown, tegula yellow. *Body length*: 7.0 mm. *Head*: eyes and ocelli normal size, not covering most of head; 38–39 antennomeres, all flagellomeres as wide as long; malar space longer than basal width of mandible and about $\frac{2}{3}$ eye height; temple broad, nearly equal to eye width; occipital carina not reaching hypostomal carina; oral space circular, width slightly greater than basal width of mandible and about $\frac{3}{4}$ face height; clypeus swollen; ocelli small, ocellular distance greater than diameter of lateral ocellus; face and frons rugose, vertex and temples rugulose; maxillary palpus not swollen; mandible small, tips not crossing when closed. *Mesosoma*: pronotum rugose; mesonotum and scutellum punctate, notauli weakly scrobiculate; mesopleuron punctate medially, smooth above episternal scrobe, subalar sulcus and sternaulus rugose; propodeum areolate, median carina sometimes absent on apical half. *Legs*: tarsal claws not pectinate, with few spines at extreme base; hind coxa rugulose dorsally. *Wings*: fore wing with vein r about $\frac{1}{2}$ length of 3RSa and $\frac{2}{3}$ length of m-cu, vein 1cu-a beyond 1M by distance equal to or very slight greater than length of 1cu-a, vein 1CUa $\frac{1}{2}$ length of 1CUB; hind wing vein RS straight, marginal cell gradually broadening to wing apex, vein r-m shorter than 1M, vein 1M about $\frac{3}{4}$ length of M+CU, vein m-

cu weak and indistinct. *Metasoma*: first tergum costate rugose, apical width about equal to length, median carina complete; second tergum costate rugose, median carina complete; third tergum costate on basal $\frac{1}{3}$, median carina absent; remainder of terga smooth; ovipositor $\frac{3}{4}$ length of hind basitarsus.

Male.—Unknown.

Holotype.—♀: WYOMING, Albany Co., 1.5 mi. W of Centennial, Medicine Bow Natl. Forest, Snowy Range, mixed forest, Malaise, Mian, July 14–27, 1991. Deposited in RMSEL.

Paratypes.—WYOMING: 1 ♀, Albany Co., Medicine Bow Nat. Forest, 1 mi. N. Lincoln Monument, mixed forest nr. sagebrush, Mian June 20–26, 1990, Malaise trap; 1 ♀, Albany Co., Medicine Bow Nat. Forest, 2 mi. N on Rd. 705, July 15–19, 1991, willow bog Malaise trap. Deposited in RMSEL, USNM.

Biology.—Unknown.

Comments.—This species is similar to *burrus* but can be distinguished by its shorter antennae and the dark colored labial palpi.

Etymology.—Named for the type locality of Medicine Bow National Forest.

Aleiodes smithi Marsh and Shaw,
new species
(Fig. 5)

Female.—*Body color*: entirely honey yellow, mesonotum occasionally marked with brown; antenna with scape and pedicel yellow, flagellum black except for middle 5–12 flagellomeres which are white; wings lightly infumated, veins brown, stigma with yellow spot at base, tegula yellow. *Body length*: 6–8 mm. *Head*: eyes and ocelli normal size; 44–50 antennomeres, flagellomeres beyond middle as long as wide; first and second flagellomeres equal in length, apical flagellomere bluntly pointed; malar space long, $\frac{2}{3}$ eye height and 2 times basal width of mandible; temple moderate, $\frac{3}{5}$ eye width; occipital carina not always meeting hypostomal carina; oral opening

moderate, width equal to $\frac{3}{5}$ face height and $\frac{3}{4}$ malar space; clypeus narrow and not protruding; ocelli small, ocellocular distance 2 times diameter of lateral ocellus; face, frons, vertex and temple rugose-coriaceous, face with short median ridge between antennae; maxillary palpus somewhat swollen; mandibles small, tips not crossing when closed. *Mesosoma*: pronotum rugose; mesonotum and scutellum coriaceous; notauli scrobiculate, meeting posteriorly in wide rugose area; mesopleuron coriaceous and dull medially, shining above episternal scrobe, subalar sulcus and sternaulus strongly rugose; propodeum strongly rugose, median carina not complete, obscured on apical half of propodeum. *Legs*: tarsal claws not pectinate, with only 2–3 slender spines at extreme base; inner spur of hind tibia less than half length of hind basitarsus; hind coxa granular dorsally at base, rugose dorsally at apex. *Wings*: lightly infumated; fore wing with vein r short, about $\frac{1}{5}$ length of 3RSa, vein 1cu-a beyond 1M by distance slightly more than length of 1cu-a, vein 1CUa nearly $\frac{1}{2}$ length of 1CUB; hind wing vein RS nearly straight, marginal cell gradually widening to apex, vein r-m shorter than 1M, vein M+CU slightly longer than 1M, vein m-cu indicated by short weakly infuscated line. *Metasoma*: first tergum strigate-rugose, slightly longer than apical width, median carina complete; second tergum strigate-rugose, median carina usually complete, sometimes indistinct apically; third tergum strigate on basal $\frac{1}{3}$, coriaceous on apical $\frac{2}{3}$, rarely a short stub of median carina present when carina on second tergum complete; remainder of terga finely coriaceous and shining; ovipositor short, $\frac{1}{2}$ length of hind basitarsus.

Male.—Essentially as in female except antennae may be slightly longer, with up to 56 antennomeres.

Holotype.—♀: VIRGINIA, Clarke Co., U. Va. Blandy Exp. Farm, 2 mi. S Boyce, July 25–August 7, 1990, Malaise trap, David R. Smith. Deposited in USNM.

Paratypes.—FLORIDA: 1 ♀, Enterprise;

1 ♀, Alachua Co., E. Gainesville, February 18, 1975, H. Greenbaum, Malaise trap; 1 ♂, Archbold Biol. Sta., Lake Placid, Highlands Co., May 5, 1989, M. Deyrup. GEORGIA: 1 ♂, Pine Mtn., Rabun Co. 1,400', May 15, 1957, W. R. M. Mason; 2 ♂, Forsyth, May 20–31, 1968, G. Heinrich. ILLINOIS: 1 ♂, N. Illinois, Andreas Bolter; 2 ♂, Hart collection #171 (no other data). KANSAS: 2 ♀, Onaga, Crevecoeur. KENTUCKY: 1 ♂, Boone Co., Big Bone Lick St. Park, June 22, 1982, R. Wharton; 3 ♀, Locust Grove, Louisville, Jefferson Co., August 13, 1978 and September, 1982, S. Riegler. MARYLAND: 6 ♀, 20 ♂, Cabin John, dates ranging from May 1, 1916 to June 24, 1920 and mostly collected by R. M. Fouts; 1 ♂, College Park, P. G. Co., June 21, 1981, S. R. Shaw; 4 ♀, 6 ♂. Glen Echo, July, 1917 and July 20, 1919, R. M. Fouts; 1 ♀, Patuxent, July, 1980; 1 ♀, Colesville, Montg. Co., June 8, 1975, A. S. Menke. MASSACHUSETTS: 1 ♀, Marthas Vineyard, August 10, 1931, C. W. Johnson; 1 ♂, Nashawena Is., Elizabeth Is., July 7, 1971, C. T. Parsons. MICHIGAN: 1 ♀, Lansing, July 17, 1956, H. Niemczyk. MISSISSIPPI: 1 ♀, Oktibbeha County, Starkville, July 11, 1987, M. Ludlow, black light trap; 1 ♀, Jefferson Davis County, July 18, 1973, J. R. McCoy, light trap. MISSOURI: 3 ♀, Williamsville, July 5–September 10, 1969, J. T. Becker; 1 ♀, Columbia, Boone Co., October 1969, F. D. Parker, collector. ONTARIO: 1 ♀, Pt. Pelee, July 17, 1962, S. M. Clark. NEW JERSEY: 1 ♂, Collingwood, July 17, 1904, G. M. Greene; 1 ♀, Moorestown, August 1, 1939, H. & M. Townes. NEW YORK: 1 ♂, Cold Spring Harbor, C. T. Brues. NORTH CAROLINA: 7 ♀, 7 ♂, Johnston Co., Clayton, August 29 and September 7, 1972, ex. *Lascoria ambigualis*, W. M. Brooks (Soybean Research Voucher Specimens); 1 ♂, Washington Co., Plymouth, September 7, 1972, W. M. Brooks (Soybean Research Voucher Specimens); 1 ♀, L. Junaluska, July 28, 1957, H. V. Weems, Jr.; 11 ♀, 7 ♂, Orange Co., Chapel Hill, September 9, 1975 to

September 4, 1976, Malaise trap; 1 ♀, Swain Co., Smokemont, July 16, 1977, Malaise trap; 2 ♀, Bertie Co. near Cahaba, July 27, 1976 and October 31, 1978, Malaise trap; 1 ♀, Mecklenburg Co., Charolette, August 22, 1979, Malaise trap; 8 ♀, 1 ♂, Martin Co. near Williamston, June 16–July 29, 1975, Malaise trap. PENNSYLVANIA: 1 ♀, North East, June 1917. TENNESSEE: 1 ♂, Lexington, Natchez Trace S. P., June 15–19, 1972, G. Heinrich. VIRGINIA: 100 ♀, 104 ♂, same data as holotype with dates ranging from May 1, 1990 to October 22, 1990; 7 ♀, 2 ♂, Louisa Co., 4 mi S Cuckoo, dates ranging from May 28, 1987 to June 18, 1988, J. Koke and D. R. Smith, Malaise trap; 1 ♂, Arlington, Country Club Hills, October 10, 1942, R. A. Cushman. WISCONSIN: 1 ♂, West Bend, Washington Co., August 13–14, 1966, H. E. Evans. MEXICO: 1 ♂, Colima, 9 mi NE Comala, July 17–18, 1983, Kovarik, Harrison, Schaffner; 1 ♀, Morelos, 4.4 mi E Cuernavaca, July 27–29, 1976, Malaise trap, Peigler, Gruetzmacher, R. & M. Murray, Schffner; 1 ♀, Oaxaca, 10.8 mi S El Punto, July 19, 1987, R. Wharton. COSTA RICA: 1 ♀, San José Prov., Ciudad Colon, 800 m, December 1989–January 1990, Luis Fournier; 1 ♀ Guanacaste Prov., Cerro 1 Hacha, nw Volcan Orosi, 300 m, 1988; 1 ♀, Cartago Prov., La Cangreja, 1,950 m, November–December, 1992, Paul Hanson; 4 ♀, Cartago Prov., Dulce Nombres, Vivero Linda Vista, 1,400 m, June–August, 1993, Paul Hanson; 7 ♀, 7 ♂, San José Prov., Zurqui de Moravia, 1,600 m, January–February, 1989, July, 1990, March–May, 1992, February, 1996, Paul Hanson. Deposited in USNM, RMSEL, TAMU, MCZ, BMNH, CNC, MISS, UCD, NCSU, NCDA, NNML, INHS, ABS, MSU.

Biology.—Three specimens were reared from *Lascoria ambigualis* Walker (Noctuidae).

Comments.—This species is distinct from all other North American species by the white annulus on the antennae. Also distinctive is the very short vein r in the

fore wing. It resembles the Neotropical species *ecuadoriensis* Brues which also has a white annulus on the antennae, but that species has darker hind tibiae, a black head and black prothoracic area, and a much deeper and coarsely scrobiculate groove between metasomal terga 2 and 3.

Etymology.—This species is named for the collector of most of the type series from Virginia, sawfly specialist David R. Smith.

***Aleiodes townesorum* Marsh and Shaw,
new species**

Female.—*Body color*: head varying from orange to light brown, antenna with scape, pedicel and basal $\frac{1}{3}$ of flagellum yellow, apical $\frac{2}{3}$ of flagellum brown; mesosoma orange, mesosternum black; first and second metasomal terga orange, third and following terga entirely black; fore and middle legs honey yellow, middle tibia and tarsus sometimes darker, hind coxa and trochanters honey yellow, hind femur honey yellow on basal $\frac{1}{3}$ or less, black on apical $\frac{2}{3}$ – $\frac{3}{4}$, hind tibia honey yellow on basal $\frac{1}{2}$, black on apical $\frac{1}{2}$, hind tarsus black; wings dusky, veins brown. *Body length*: 5.0–6.0 mm. *Head*: 35–38 antennomeres, nearly all flagellomeres as wide as long; eye small, malar space $\frac{1}{2}$ eye height and longer than basal width of mandible; temple slightly less than width of eye, not swollen in dorsal view; occipital carina not meeting hypostomal carina; oral space circular, slightly wider than basal width of mandible; ocelli small, ocellocular distance about twice diameter of lateral ocellus; face costate punctate, malar space punctate, temple punctulate and shining, vertex costate punctate, frons rugulose and shining. *Mesosoma*: pronotum rugose; mesonotum and scutellum punctate, notauli weakly scrobiculate, meeting in triangular rugose area before scutellum; mesopleuron minutely punctate and shining, subalar sulcus and sternaulus rugose; propodeum rugose, median carina distinct only on basal half. *Legs*: tarsal claws not pectinate; hind coxa somewhat rugulose dorsally. *Wings*: fore wing with

vein r $\frac{1}{3}$ length 3RSa and $\frac{1}{2}$ length of m-cu, vein 1cu-a beyond 1M by distance greater than length of 1cu-a, vein 1CUa $\frac{1}{2}$ length of 1CUB; hind wing marginal cell gradually broadening to apex, vein RS straight, M+CU 1.5 times length of 1M, vein r-m about $\frac{2}{3}$ length of 1M. *Metasoma*: first tergum wider at apex than long, costate-rugose, median carina complete; second tergum costate-rugose, median carina complete, third tergum costate on basal $\frac{1}{2}$, smooth on apical $\frac{1}{2}$; remainder of terga smooth; ovipositor short, less than $\frac{1}{2}$ length of hind basitarsus.

Male.—Essentially as in female; head, flagellum and mesosoma black; 45–47 antennomeres.

Holotype.—♀: ARIZONA, Portal, August 23, 1987, H. and M. Townes. Deposited in AEI.

Paratypes.—ARIZONA: 8 ♀, 13 ♂, same data as holotype with date of August 23–September 12, 1987; 1 ♀, 5 mi. W. Portal, Chiricahua Mtns., August 18, 1958, R. E. Rice. Deposited in USNM, RMSEL, AEI.

Biology.—Unknown.

Comments.—This species is very similar to *bucculentus* but can be distinguished by the darker hind leg, lighter head color, and the temple which is not swollen in dorsal view.

Etymology.—The specific name is in honor of our friends and colleagues, Marjorie and her late husband Henry Townes.

***Aleiodes vierecki* Marsh and Shaw,
new species**

(Fig. 3)

Female.—*Body color*: entirely honey yellow, apical flagellomeres occasionally light brown; wings hyaline, fore wing veins brown, yellow at wing base, tegula yellow, hind wing veins yellow. *Body length*: 7.0–8.5 mm. *Head*: 56–65 antennomeres, basal flagellomeres about as wide as long; malar space equal to basal width of mandible and about $\frac{1}{3}$ eye height; temple narrow, about $\frac{1}{2}$ eye width; occipital carina not meeting

hypostomal carina; oral opening small, circular, diameter about equal to basal width of mandible and slightly less than eye height; ocelli moderate sized, diameter of lateral ocellus equal to or slightly greater than ocell-ocular distance; head entirely rugulose; palpi not swollen; mandibles small, tips not crossing when closed. *Mesosoma*: pronotum rugose laterally; mesonotum and scutellum coriaceous, notauli deep, scrobiculate, meeting in triangular rugose area before scutellum; mesopleuron smooth dorsally, rugulose below and at subalar sulcus and sternaulus; propodeum rugose dorsally, coriaceous laterally, median carina obscured on apical 1/3. *Legs*: tarsal claws not pectinate, hind coxa smooth dorsally. *Wings* (Fig. 3): fore wing with vein r 1/3 length of 3RSa and about 1/2 length of m-cu, vein 1cu-a beyond 1M by distance slightly greater than length of 1cu-a, vein 1CUa 1/3 length of 1Cub; basal 1/3 of hind wing vein RS nearly parallel to apical wing margin, then curving downward, marginal cell suddenly widening, vein r-m about 2/3 length of 1M, vein 1M about 1/5 length of M+CU, vein m-cu short but distinct, often arising from 2M slight distad of r-m. *Metasoma*: first tergum rugulose costate, apical width twice basal width, median carina complete; second tergum rugulose costate, median carina complete, third tergum rugulose costate on basal 1/2, remainder weakly coriaceous and shining; remainder of terga weakly coriaceous and shining; ovipositor about 3/4 length of basitarsus.

Male.—Essentially as in female.

Holotype.—♀: KANSAS, Lawrence, April 1956, A. R. Barr, collected at light. Deposited in USNM.

Paratypes.—KANSAS: 18 ♀, 1 ♂, same data as holotype. MICHIGAN: 2 ♀, 1 ♂, Midland Co., June 6, 1939, June 9, 1940, June 23, 1941, R. R. Dreisbach. OKLAHOMA: 1 ♀, Latimer Co., Red Oak, May 7–14, 1985, K. Stephan. Deposited in USNM, RMSEL, AEI.

Biology.—Unknown.

Comments.—This species is very close

to *atricornis* but is separated by the larger ocelli, slightly curved hind wing vein RS and narrower temple. The short malar space places it near species in the *unipunctator* group, but those species have the malar space even shorter and bodies bicolored black and red.

Etymology.—Named for H. L. Viereck who was a student of the Braconidae and other parasitic Hymenoptera in the early 1900's.

ALEIODES UNIPUNCTATOR SPECIES-GROUP

Included species.—*unipunctator* (Thunberg) 1822, **n. comb.**, Europe; *ruficornis* (Herrich-Schaeffer) 1838, **n. comb.**, Europe; *terminalis* Cresson 1869, North America; *hirtus* (Thomson) 1891, **n. comb.**, Europe; *harrimani* (Ashmead) 1902, **n. comb.**, North America; *eurinus* (Telenga) 1941, **n. comb.**, Europe; *turkestanicus* (Telenga) 1941, **n. comb.**, Europe; *alboannulatus* (Belokogyl'skij) 1988, **n. comb.**, Europe; *pseudoterminalis* n. sp.

Diagnostic characters.—Body bicolored red or orange and black; malar space shorter than or equal to basal width of mandible (Fig. 7); hind wing vein RS straight, marginal cell narrowest at base and widening toward wing apex.

Comments.—This species-group is distinguished from the *gasterator* group by its bicolored body and shorter malar space.

KEY TO THE NORTH AMERICAN SPECIES OF THE *UNIPUNCTATOR* SPECIES-GROUP

- 1. Third metasomal tergum costate on basal 1/4, remainder of tergum smooth and shining (Fig. 11) *harrimani* (Ashmead)
- Third metasomal tergum costate on at least basal 1/2, remainder of tergum coriaceous or striate and dull (Fig. 12) 2
- 2(1). Second metasomal tergum always orange or red; fore and middle femora entirely orange; length of ovipositor at most 1/2 length of hind basitarsus *terminalis* Cresson
- Second metasomal tergum black, rarely partially or entirely orange; fore and middle femora orange with black at apex; length of ovipositor at least 2/3 length of hind basitarsus, often equal in length *pseudoterminalis*, new species

Aleiodes harrimani (Ashmead),
new combination
 (Fig. 11)

Rhogas harrimani Ashmead 1902:253.

Diagnosis.—Body bicolored, head, antenna, mesosoma black, first and second metasomal terga orange, remainder black, mandible, tegula, fore and middle legs orange except apical tarsomere black, hind coxa, trochanter and femur orange, hind tibia yellow on basal half, black on apical half, hind tarsus black; malar space short, less than basal width of mandible; face rugulose-coriaceous, frons rugose, vertex and temple coriaceous; mesopleuron smooth medially, subalar sulcus and sternaulus rugose; propodeum rugose, median carina complete; first and second metasomal terga costate, median carina complete, third metasomal tergum costate on basal $\frac{1}{4}$ or less, remainder of tergum smooth and shining; vein 1cu-a of fore wing beyond vein 1M by distance equal to 1.5 length of 1cu-a, hind wing marginal cell narrowest basally, gradually widening apically, vein RS straight in apical $\frac{1}{2}$ (Fig. 11); tarsal claws not pectinate.

Type material examined.—*Rhogas harrimani* Ashmead, holotype male, Fox Point, Alaska, Harriman Expedition [USNM].

Distribution.—Alaska, Utah, Washington, South Dakota, Colorado, Montana and Wyoming.

Biology.—Unknown.

Comments.—Although previously recorded only from Alaska, *harrimani* also occurs at high elevations in northwestern United States. It is attracted to lights and has been taken in Malaise traps. It is superficially similar to *terminalis* in size and color, but can be recognized by its shorter malar space, hind tibia without a black base, and the smooth apex of the third metasomal tergum.

Aleiodes pseudoterminalis Marsh and
 Shaw, new species
 (Fig. 12)

Female.—*Body color*: head and mesosoma black; antenna brown; first metasomal

tergum red, remainder of terga black, venter of metasoma orange on basal half; legs orange, apex of fore and middle femur black, apical segment of fore and middle tarsus dark brown; apex of hind femur black, base and apex of hind tibia black, orange medially, hind tarsus dark brown; wings hyaline, veins dark brown, tegula yellow. *Body length*: 7.0–8.0 mm. *Head*: 56–59 antennomeres, all flagellomeres slightly longer than wide, first and second flagellomeres about equal in length; malar space equal to or slightly less than basal width of mandible and $\frac{1}{3}$ to $\frac{1}{4}$ eye height; temple $\frac{1}{2}$ eye width; occipital carina obscured at apical ends, not quite meeting hypostomal carina; oral opening small, circular, about equal in length to malar space; clypeus somewhat swollen; ocelli moderate in size, ocellocular distance equal to diameter of lateral ocellus; face coarsely rugose with smooth raised median ridge below antennae which usually terminates in several carinae near clypeus; frons costate; vertex and temple coarsely coriaceous; occiput smooth and shining; maxillary palpus not swollen; mandible small. *Mesosoma*: pronotum rugose costate; mesonotum and scutellum coriaceous; notauli shallow, scrobiculate, meeting posteriorly in narrow rugose area; mesopleuron smooth and shining medially with scattered punctures, subalar sulcus and sternaulus rugose; propodeum coarsely rugose, median carina usually complete, occasionally obsolete apically. *Legs*: tarsal claws not pectinate apically, with a few stout spines at base; inner spur of hind tibia about $\frac{1}{3}$ length of hind basitarsus; hind coxa smooth dorsally. *Wings*: hyaline; fore wing vein r $\frac{1}{2}$ length of 3RSa and $\frac{1}{2}$ length of m-cu, vein 1cu-a beyond 1M by distance twice length of 1cu-a, vein 1CUa nearly $\frac{1}{2}$ length of 1CUB; hind wing with vein RS straight but not parallel with wing margin, marginal cell widening toward apex, vein r-m slightly shorter than 1M, vein M+CU slightly longer than 1M, vein m-cu short and weakly indicated. *Metasoma* (Fig. 12): first tergum costate, length equal to basal width, median carina

complete; second tergum costate, median carina complete; third tergum costate on basal half, median carina absent; remainder of terga coriaceous; suture between second and third terga deep and strongly scrobiculate; ovipositor at least $\frac{2}{3}$ length of hind basitarsus, sometimes equal in length.

Male.—Essentially as in female.

Holotype.—♀: VIRGINIA, Arlington, May 25, 1938, J. F. G. Clarke, ex. *Eupsilia devia*. Deposited in USNM.

Paratypes.—MARYLAND: 1 ♀, Glen Echo, June 5, 1938, J. F. G. Clarke, ex. *Eupsilia devia*; 12 ♀, 4 ♂, Silver Spring, May 19–28, 1938, J. F. G. Clarke, ex. *Eupsilia devia*; 1 ♀, Burtonsville, June 29, 1980, A. S. Menke. MICHIGAN: 1 ♀, 1 ♂, Midland Co., July 11, 1936, July 2, 1938, R. R. Dreisbach; 1 ♀, Washtenaw Co., Ann Arbor, July 12–21, 1982, R. Wharton; 2 ♀, Ann Arbor, June 1976, I. and P. Gauld. NEW HAMPSHIRE: 1 ♂, Hanover, C. M. Weed. NORTH CAROLINA: 2 ♀, 25 ♂, Swain Co., Smokemont, June 6–August 26, 1977, Malaise trap. PENNSYLVANIA: 1 ♀, Enola, July 20, 1908. TENNESSEE: 1 ♂, Elkmont GSMN Park, June 15, 1946, R. R. Dreisbach. VIRGINIA: 5 ♀, same data as holotype with additional dates of May 23, 25, 26, 1938, June 1, 1938; Vienna, 1 ♀, August 9, 1936, J. C. Bridwell. WISCONSIN: 1 ♀, Fond du lac Co., T13N, R19E, S23, September 4, 1975, Gypsy moth M.T.; 1 ♀, 1 ♂, Jackson Co., T21N, R4W, S27, May 27–September 22, 1975, Gypsy moth M.T.; 1 ♀, T21N, R4W, S33, August 9–16, 1976, Gypsy Moth M.T.; 1 ♀, 1 ♂, Oneida Co., T35N, R11E, S17, July 8–29, 1975, Gypsy moth M.T.; 1 ♀, Dane Co., July 17, 1918, W. S. Marshall. QUEBEC: 1 ♀, Wakefield, June 21, 1966, G.S. Walley; 1 ♀, Foster, August 2, 1929, G.S. Waley; 1 ♀, Foster, August 2, 1929, G. S. Walley. ONTARIO: 1 ♀, 1 ♂, One Sided Lake, July 19, 1930, S. M. Clark; 1 ♂, Finland, July 21, 1960, S. M. Clark; 4 ♀, Thartway Island, St. Lawrence Is. Nat. Park, July 22–August 11, 1976, W. Reid, Malaise trap; 2 ♀, Cumberland, July 16,

1975, L. Ling. CANADA: 2 ♀, 2 ♂, no locality, collection C. F. Baker. Deposited in USNM, RMSEL, TAMU, CNC, NNML, NCDA, AEI.

Biology.—Several specimens in the type series were reared from the noctuid *Eupsilia devia* (Grote).

Comments.—This species has been confused with *terminalis* and is very similar but differs by the black second metasomal tergum, the black apices of the fore and middle femora, and the longer ovipositor.

Etymology.—From the Greek *pseudos* meaning false in reference to the confusion of this species with *terminalis*.

Aleiodes terminalis Cresson
(Figs. 6–7)

Aleiodes terminalis Cresson 1869:379.

Diagnosis.—Body bicolored black and orange, head and mesosoma black, first and second metasomal terga orange, remainder of terga black, third tergum rarely all or partly orange, antenna light brown basally to black apically, fore leg, middle leg, hind coxa and trochanters orange, hind femur orange with black at extreme apex, hind tibia brown with light yellow on basal third, hind tarsus black, wings hyaline, veins brown, stigma brown, tegula yellow; body length, 5.0–8.0 mm; 55–62 antennomeres; face rugulose-coriaceous, frons rugose, vertex and temple coriaceous; length of malar space equal to basal width of mandible and $\frac{1}{4}$ eye height (Fig. 7); ocellocular distance about equal to diameter of lateral ocellus; pronotum rugose; mesonotum and scutellum coriaceous, mesopleuron smooth medially, sternaulus and subalar sulcus rugose; propodeum rugose, median carina complete; first and second metasomal terga costate, median carina complete, third tergum costate on basal half, median carina absent; fore wing with vein 1cu-a beyond 1M by distance more than twice length of 1cu-a; hind wing marginal cell gradually widening, vein RS straight, vein m-cu present as

short stub (Fig. 6); tarsal claws not pectinate.

Type material examined.—*Aleiodes terminalis* Cresson, holotype female, Eastern, Middle, Southern and Western States [ANSP].

Distribution.—Widely distributed over Canada and the United States south to the Mexican border; very rare below the 30th parallel.

Biology.—A common parasitoid of the noctuid *Pseudaletia unipuncta* (Haworth) but has also been recorded from *Nephelodes minians* Guenée, *Spodoptera frugiperda* (Smith), *S. ornithogalli* (Guenée) and *Xestia smithii* (Snellen). Exit hole on mummy is near the posterior end.

Comments.—This is the most commonly collected species in the genus and the majority of museum specimens are *terminalis*. It can be distinguished from other bicolored black and orange species by the combination of the gradually widening marginal cell in the hind wing, the position of vein 1cu-a in the fore wing, and the non-pectinate tarsal claws. It is also commonly collected at lights.

ACKNOWLEDGMENTS

We thank the curators of all the collections listed in Methods for the loan of specimens for this study. Kent Hampton, Kansas State University, prepared the scanning electron micrographs and Linda Lawrence, USDA Systematic Entomology Laboratory, prepared the wing drawings. This research was supported, in part, by grant DEB-930-6314 from the National Science Foundation to S. R. Shaw. Additional support was provided by supplemental REU (Research Experience for Undergraduates) grants in 1994, 1995 and 1996.

LITERATURE CITED

- van Achterberg, C. 1991. Revision of the genera of the Afrotropical and W. Palaearctic Rogadinae Foerster (Hymenoptera: Braconidae). Zoologische Verhandlungen 273: 1–120.
- Ashmead, W. H. 1889(1888). Descriptions of new Braconidae in the collection of the U.S. National Museum. Proceedings of the United States National Museum 11: 611–671.
- . 1902. Papers from the Harriman Alaska Expedition. 28. Hymenoptera. Proceedings of the Washington Academy of Sciences 4: 117–274.
- Cresson, E. T. 1869. List of the North American species of the genus *Aleiodes* Wesm. Transactions of the American Entomological Society 2: 377–382.
- . 1872. Hymenoptera Texana. Transactions of the American Entomological Society 4: 153–292.
- Cresson, E. T., Jr. 1916. The Cresson types of Hymenoptera. Memoirs of the American Entomological Society No. 1, 141 pp.
- Delfin, G. H. and R. A. Wharton. 2000. Historical review of the genera *Aleiodes* and *Rogas* in Mexico, with a redescription of *Aleiodes cameronii* (Hymenoptera: Braconidae). Pan-Pacific Entomologist 76: 58–70.
- Enderlein, G. 1920(1918). Zur kenntnis ausureuropäischer Braconiden. Archiv für Naturgeschichte 84A(11): 51–224.
- Fortier, J. C. and S. R. Shaw. 1999. Cladistics of the *Aleiodes* lineage of the subfamily Rogadinae (Hymenoptera: Braconidae). Journal of Hymenoptera Research 8(2): 204–237.
- Harris, R. A. 1979. A glossary of surface sculpturing. Occasional Papers in Entomology of the California Department of Food and Agriculture no. 28, pp. 1–31.
- Huber, J. T. and M. J. Sharkey. 1993. Chapter 3, Structure, pp. 13–59. In Goulet, H. and J. T. Huber, eds., Hymenoptera of the World: An Identification Guide to Families. Agriculture Canada Research Branch Publication 1894/E, 668 pp.
- Marsh, P. M. 1979. Family Braconidae, pp. 144–313. In Krombein, K. V. et. al., eds., Catalog of Hymenoptera in America North of Mexico, Vol. 1, Symphyta and Apocrita (Parasitica). Smithsonian Institution Press, Washington, DC, 1,198 pp.
- . 1989. Notes on Braconidae (Hymenoptera) associated with jojoba (*Simmondsia chinensis*) and descriptions of new species. Pan-Pacific Entomologist 65: 58–67.
- Marsh, P. M. and S. R. Shaw. 1998. Revision of North American *Aleiodes* Wesm. (Part 3): The *seriatus* (Herrich-Schaeffer) species-group (Hymenoptera: Braconidae, Rogadinae). Proceedings of the Entomological Society of Washington 100(3): 395–408.
- . 1999. Revision of North American *Aleiodes* Wesm. (Part 5): The *melanopterus* (Erichson) species-group in North America (Hymenoptera: Braconidae, Rogadinae). Journal of Hymenoptera Research 8(1): 98–108.
- Nason, W. A. 1905. Parasitic Hymenoptera of Algonquin, Illinois-II. Entomological News 16:293–298.
- Sharkey, M. J. and R. A. Wharton. 1997. Morphology

- and terminology, chapter 2, pp. 19–37. *In* Wharton, R. A., P. M. Marsh and M. J. Sharkey, eds., *Manual of New World Genera of the Family Braconidae*. Special Publication of the International Society of Hymenopterists 1, 439 pp.
- Shaw, M. R. 1983. On[e] evolution of endoparasitism: The biology of some genera of Rogadinae (Braconidae). *Contributions of the American Entomological Institute* 20: 307–328.
- . 1994. Chapter 7, Parasitoid host ranges, pp. 112–144. *In* Hawkins, B. A. and W. Sheehan, eds., *Parasitoid Community Ecology*. Oxford University Press, Oxford.
- Shaw, M. R. and T. Huddleston. 1991. Classification and biology of braconid wasps. *Handbooks for the Identification of British Insects* 7: 1–126.
- Shaw, S. R. 1995. Chapter 12.2, Braconidae, pp. 431–463. *In* Hanson, P. E. and I. D. Gauld, eds., *The Hymenoptera of Costa Rica*. Oxford University Press, Oxford.
- . 1997. Subfamily Rogadinae, pp. 403–414. *In* Wharton, R. A., P. M. Marsh and M. J. Sharkey, eds., *Manual of New World Genera of the Family Braconidae*. Special Publication of the International Society of Hymenopterists 1, 439 pp.
- Shaw, S. R., P. M. Marsh and J. C. Fortier. 1997. Revision of North American *Aleiodes* Wesmael (Part 1): The *pulchripes* Wesmael species-group in the New World (Hymenoptera: Braconidae, Rogadinae). *Journal of Hymenoptera Research* 6(1): 10–35.
- . 1998a. Revision of North American *Aleiodes* Wesmael (Part 2): The *ductor* Thunberg species-group in the New World (Hymenoptera: Braconidae, Rogadinae). *Journal of Hymenoptera Research* 7(1): 62–73.
- . 1998b. Revision of North American *Aleiodes* Wesmael (Part 4): The *albitibia* (Herrich-Schaeffer) and *praetor* (Reinhard) species-group (Hymenoptera: Braconidae, Rogadinae). *Proceedings of the Entomological Society of Washington* 100(3): 553–565.
- Viereck, H. L. 1903. Hymenoptera of Beulah, New Mexico. *Transactions of the American Entomological Society* 29: 43–100.
- . 1905. Notes and descriptions of Hymenoptera from the Western United States, in the collection of the University of Kansas. *Transactions of the Kansas Academy of Sciences* 19: 264–326.
- . 1917(1916). Guide to the insects of Connecticut. Part III. The Hymenoptera, or wasp-like insects, of Connecticut. *Bulletin of the Connecticut State Geological and Natural History Survey* 22: 1–824.
- Withington, C. H. 1909. Insect types and cotypes. A preliminary list of those in the Francis Hungton Snow Entomological Collections. *Transactions of the Kansas Academy of Sciences* 22: 327–340.